

Environmental Impact of Agriculture

Preeti Nagora

Assistant Professor, Department of Geography, Govt. Arts College, Kota

The environmental impact of agriculture is the effect that different farming practices have on the ecosystems around them, and how those effects can be traced back to those practices. The environmental impact of agriculture varies widely based on practices employed by farmers and by the scale of practice. Farming communities that try to reduce environmental impacts through modifying their practices will adopt sustainable agriculture practices. The negative impact of agriculture is an old issue that remains a concern even as experts design innovative means to reduce destruction and enhance eco-efficiency. Though some pastoralism is environmentally positive, modern animal agriculture practices tend to be more environmentally positive, modern animal agriculture practices tend to be more environmentally destructive than agricultural practices focused on fruits, vegetables and other biomass. The emissions of ammonia from cattle waste continues to raise concerns over environmental pollution.

When evaluating environmental impact, experts use two types of indicators: “means-based”, which is based on the farmer’s production methods, and “effect-based”, which is the impact that farming methods have on the farming system or on emissions to the environment. An example of a means based indicator would be the quality of groundwater, that is affected by the amount of nitrogen applied to the soil. An indicator reflecting the loss of nitrate to groundwater would be effect-based. The means-based evaluation considers the actual effects of the agricultural system. For example, the means-based analysis might look at pesticides and fertilisation methods that farmers are using, and effect-based analysis would consider how much CO₂ is being emitted or what the nitrogen content of the soil is.

The environmental impact of agriculture involves impacts on a variety of different factors : the soil, water, the air, animal and soil variety, people, plants, and the food itself. Agriculture contributes to a number larger of environmental issues that cause environmental degradation including : climate change, deforestation, biodiversity loss, dead zones, genetic engineering, irrigation problems, pollutants, soil degradation, and waste. Because of agriculture’s importance to global social and environmental systems, the international community has committed to increasing sustainability of food production as part of Sustainable Development Goal 2 : “End hunger, achieve food security and improved nutrition and promote sustainable agriculture”. The United Nations Environment Programme’s 2021 “Making Peace with Nature” report highlighted agriculture as both a driver and an industry under threat from environmental degradation.

DIRECT EFFECTS

An irrigation scheme draws water from groundwater, rivers, lakes or overland flow and distributes it over an area. Hydrological, or direct, effects of doing this include reduction in downstream river flow, increased evaporation in the irrigated area, increased level in the water table as groundwater recharge in the area is increased and flow increased in the irrigated area. Likewise, irrigation has immediate effects on the provision of moisture to the atmosphere, inducing atmospheric instabilities and increasing downwind rainfall, or in other cases modifies the atmospheric circulation, delivering rain to different downwind areas. Increases or decreases in irrigation are a key area of concern in precipitation studies, that examine how significant modifications to the delivery of evaporation to the atmosphere can alter downwind rainfall.

INDIRECT EFFECTS

Indirect effects are those that have consequences that take longer to develop and may also be longer-lasting. The indirect effects of irrigation include the following:

- Waterlogging
- Soil salination
- Ecological damage
- Socioeconomic impacts

The indirect effects of waterlogging and soil salination occur directly on the land being irrigated. The ecological and socioeconomic consequences take longer to happen but can be more far reaching.

Some irrigation schemes use water wells for irrigation. As a result, the overall water level decreases. This may cause water mining, land/soil subsidence, and, along the coast, saltwater intrusion.

SUSTAINABLE AGRICULTURE

The exponential population increase in recent decades has increased the practice of agricultural land conversion to meet the demand for food which in turn has increased the effects on the environment. The global population is still increasing and will eventually stabilize, as some critics doubt that food production, due to lower yields from global warming, can support the global population.

Agriculture can have negative effects on biodiversity as well. Organic farming is a multifaceted sustainable agriculture set of practices that can have a lower impact on the environment at a small scale. However, in most cases organic farming results in lower yields in terms of production per unit area. Therefore, widespread adoption of organic agriculture will require additional land to be cleared and water resources extracted to meet the same level of production. A European meta-analysis found that organic farms tended to have higher soil organic matter content and lower nutrient losses (nitrogen leaching, nitrous oxide emissions, and ammonia emissions) per unit of field area but higher ammonia emissions, nitrogen leaching and nitrous oxide emissions per product unit. It is believed by many that conventional farming systems cause less rich biodiversity than organic systems. Organic farming has shown to have on average 30% higher species richness than conventional farming. Organic systems on average also have 50% more organisms. This data has some issues because there were several results that showed a negative effect on these things when in an organic farming system. The opposition to organic agriculture believes that these negatives are an issue with the organic farming system. What began as a small scale, environmentally conscious practice has now become just as industrialized as conventional agriculture. This industrialization can lead to the issues shown above such as climate change, and deforestation.

REGENERATIVE AGRICULTURE

Regenerative agriculture is a conservation and rehabilitation approach to food and farming systems. It focuses on topsoil regeneration, increasing biodiversity, improving the water cycle, enhancing ecosystem services, supporting biosequestration, increasing resilience to climate change, and strengthening the health and vitality of farm soil.

REFERENCES

- [1] "Effects of a Carbon Tax on the Economy and the Environment". Congressional Budget Office. 22 May 2013. Retrieved 29 September 2017.
- [2] Kalkuhl, Matthias (September 2013). "Renewable energy subsidies : Second-best policy or fatal aberration for mitigation?" (PDF). *Resource and Energy Economics*, 35 (3) : 217-234, doi:10.1016/j.reseneeco.2013.01.002. Retrieved 20 August 2018.
- [3] Jump up to; Bashmakov, I; et al. (2001). "Policies, Measures, and Instruments". In B. Metz; et al. (eds.). *Climate Change 2001 : Mitigation. Contribution of Working Group III to the Third Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge University Press, Cambridge, UK, and New York, N.Y., U.S.A. Retrieved 20 May 2009.
- [4] Helm, D. (2005). "Economic Instruments and Environmental Policy". *The Economic and Social Review*. 36(3):4-5. Archived from the original on 1 May 2011. Retrieved 8 April 2011.